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a performing step to perform a predetermined
process based on the parameter.

REMARKS

This application has been carefully reviewed in light of the Office Action dated March 10, 2000. Claims 1 to 7, 9 to 36, 38 to 65 and 67 to 93 are in the application with Claims 8, 37 and 66 having been cancelled and Claims 19 to 36, 38 to 65 and 67 to 93 having been withdrawn from further consideration. Claims 7, 10, 36, 39, 65, 68, 90 and 91 have been amended.¹ Of the claims currently under consideration (Claims 1 to 7 and 9 to 18), Claims 1, 4, 7 and 10 are independent. Reconsideration and further examination are respectfully requested.

Before addressing the merits of the Office Action, Applicants note that this application has been subject to a restriction requirement under MPEP § 806.05(e) which has been made "final". Applicants respectfully request that the Examiner reconsider and withdraw the restriction requirement.

Applicants previously traversed the restriction requirement in their response filed December 27, 1999. In

¹/Although Claims 36, 39, 65, 68, 90 and 91 have been withdrawn from further consideration, they have been amended here for consistency with their corresponding claims currently under consideration.

that response, Applicants pointed out that the Examiner has not met the burden required under MPEP § 806.05(e), and therefore the restriction requirement was improper.

In the present Office Action, the restriction requirement was considered proper and made final solely on the premise that the claims are directed to different statutory categories. However, MPEP § 806.05(e) requires more than a mere showing that the inventions are in different statutory categories. According to MPEP § 806.05(e) it is insufficient to demonstrate that inventions are in different statutory categories. Rather: "In applications claiming different statutory categories, . . . [the Examiner must show] either or both of the following . . . ; (1) that the process as claimed can be practiced by another materially different apparatus or by hand, or (2) that the apparatus as claimed can be used to practice another and materially different process." Therefore, merely showing that the inventions are in different statutory categories is not enough to warrant restriction. Even if the inventions are in different statutory categories, restriction is only proper if either or both of criteria (1) and (2) above are met. Since the Office Action has not addressed either (1) or (2) above, the Examiner has failed to meet the burden required by MPEP § 806.05(e) and thus the restriction requirement is not proper.

Moreover, Applicants submit that many of the withdrawn claims recite substantially similar features to corresponding claims that are currently under consideration. These claims should be examined in the same application. For instance, Claims 1 to 3 are method claims, Claims 30 to 32 are apparatus claims, Claims 59 to 61 are computer-executable process step claims, and Claim 88 is a computer-readable medium claim, all of which are directed to control of a print operation of an ink jet printer comprising: a determination of print head temperature; and control of a capping sequence based on the determined print head temperature. Therefore, since Claims 1 to 3 are currently being examined, Claims 30 to 32, 59 to 61 and 88 clearly should be examined together with Claims 1 to 3.

A similar analysis applies to Claims 4 to 6, 33 to 35, 62 to 64 and 89; Claims 7 to 9, 33 to 35, 62 to 64, and 89; and Claims 10 to 18, 39 to 47, 68 to 76, and 91.

Therefore, neither of MPEP § 806.05(e) criteria (1) or (2) can be met since the process as claimed cannot be practiced by an apparatus that differs materially, and the apparatus as claimed cannot be used to practice a process that differs materially.

Since Claims 1 to 18 are currently being examined, Applicants submit that it would not be an undue burden on the

Examiner to examine corresponding claims in the present application. Therefore, at least Claims 30 to 47, 59 to 76, and 88 to 91 should be examined in the present application together with Claims 1 to 18. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the restriction of these claims and that they be given an action on the merits.

With regard to the remaining claims currently withdrawn from consideration, Claims 19 to 29, 48 to 58, 77 to 87, 92 and 93 are all directed to cooling of a print head in an ink jet printer. Of the claims currently under consideration, Claims 4 to 6, and 7 to 9 include the feature of cooling the print head. As such, it is not seen how a search of the art encompassing all of these claims would be an undue burden on the Examiner since they are all are generally directed to subject matter within the same field of search. Therefore, Applicants believe the restriction of Claims 19 to 29, 48 to 58, 77 to 87, 92 and 93 is also improper and respectfully request that the Examiner reconsider and withdraw the restriction of these claims as well.

Turning to the substance of the Office Action, the specification was objected to under 35 C.F.R. § 1.71(a) and (b). Applicants submit that the specification provides a

written description of the invention in such full, clear, concise, and exact terms as to enable any person skilled in the art to make and use the invention, and that the specification sets forth the precise invention for which a patent is solicited in such a manner as to distinguish it from other inventions and from what it is old. To assist the Examiner in understanding the invention, Applicants respectfully direct the Examiner's attention to at least Figures 6 through 8 and the accompanying description from page 13, line 1 to page 21, line 13 which provides a clear understanding of the invention. Withdrawal of the objection is therefore respectfully requested.

Figures 1 to 8 were objected to for not containing a legend such as "prior art". Applicants submit that Figures 1 through 8 do not illustrate the prior art in the context of M.P.E.P. § 608.02(g) and nowhere does the specification state that anything shown in Figures 1 through 8 is prior art. Rather, each of Figures 1 through 8 illustrate various embodiments for the practice of the invention. In fact, the originally filed specification at page 6, lines 15 through 37, states that each figure illustrates some aspect of the invention. Accordingly, withdrawal of the objection of the drawings is respectfully requested.

Claims 5, 6, 9, 15, 16 and 18 were rejected under 35 U.S.C. § 112, second paragraph. The rejection of Claim 5 as allegedly reciting language somehow deemed "futuristic" is respectfully traversed. In this regard, Applicants would respectfully point that this rejection overlooks the fact that the rejected claim is only a sentence fragment with the first part of the sentence commencing on line 1 of page 22 with the words "WHAT IS CLAIMED IS:". As will be recognized, the verb in the sentence is therefore the word "IS" which is in the present tense. Thus, the rejection is founded on a faulty premise.

Moreover, Applicants are unaware of any prohibition against the use of the future or any other tense. The touchstone inquiry for compliance with §112, second paragraph, is clarity and clarity alone. The rejection makes no allegation of unclarity; rather, the rejection appears only to object to the format of the claim and to language somehow deemed "futuristic". Such a rejection therefore contravenes express USPTO guidelines on determining compliance with §112:

A fundamental principle contained in 35 U.S.C. § 112, second paragraph, is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever terms they choose so long as the terms are not used in ways that are contrary to accepted meanings in the art. Applicants may use functional language,

alternative expressions, negative limitations, or any style of expression of format or claim which makes clear the boundaries of the subject matter for which protection is sought. As noted by the Court in *re Swinehart*, [citation omitted], a claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought (MPEP § 2173.01 (emphasis added)).

Since no allegation of unclarity has been made in the rejection, and since Applicants are unaware of any Court decision or USPTO guideline prohibiting use of language deemed "futuristic", the rejection is improper and should be withdrawn. Of course, should the Examiner be aware of some legal precedent that prohibits use of language deemed "futuristic", he is respectfully requested to cite it.

Regarding the alleged ambiguity of Claim 9, Applicants submit that the claim language in question is clear and would be understood by those skilled in the art. As specified at MPEP § 2173.02:

[The] requirement [for § 112, second paragraph] is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of: (A) the content of a particular application disclosure; (B) the teachings of the prior art; and (C) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

In this regard, Applicants respectfully direct the Examiner's attention to page 16, lines 23 to 28 of the

present specification which states: "In the preferred embodiment, the predetermined number of ink droplets that are ejected is thirty per nozzle at a frequency of approximately two kilohertz. This frequency is lower than the frequency used for printing, which is at least five kilohertz."

Accordingly, the claim is clear on its face and would be clearly understood by those skilled in the art. Withdrawal of the § 112 rejection is respectfully requested.

Claims 1 to 18 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 4,664,542 (Tsugita) in view of U.S. Patent No. 5,097,276 (Midorikawa). Reconsideration and withdrawal of the rejection are respectfully requested.

The present invention according to independent Claims 1 and 4 controls a printing operation of an ink jet printer by controlling a capping operation of a print head based on the print head temperature. In conventional ink jet printers, upon completion of a printing operation, the print head is capped while the print head is still hot, thereby trapping hot ink in the print head nozzles and flow passages leading to the nozzles. The hot ink often forms an improper meniscus in both the print head nozzles and the flow passages leading to the print head nozzles. Additionally, the hot ink often adheres to the outside of the print head nozzles and

dries up, thereby resulting in poor printing quality when printing resumes.

The present invention according to independent Claims 1 and 4 addresses the foregoing by control of capping the print head. According to the invention, the print head is capped either based on a determined print head temperature (Claim 1), or after the print head is cooled (Claim 4). As a result, the print head is not capped while hot ink remains in the print head nozzles and flow passages. Therefore, a better ink meniscus is formed in the print head nozzles and flow passages, and the ink is less likely to adhere to the outside of the nozzles and dry up. Accordingly, the printing quality when recording again commences is improved.

With specific reference to the claims, independent Claim 1 is a method of controlling a print operation of an ink jet printer, comprising the steps of determining a print head temperature, and controlling a capping sequence based on the determined print head temperature.

Independent Claim 4 is a method of controlling a print operation of an ink jet printer, comprising the steps of cooling a print head using a predetermined method, and capping the print head after the print head is cooled.

The applied art is not seen to disclose or to suggest the foregoing features of Claims 1 and 4. In particular, the applied art is not seen to disclose or to

suggest at least the feature of controlling a capping sequence of a print head based on a determined print head temperature (Claim 1), or capping a print head after the print head is cooled (Claim 4).

Tsugita relates to wire dot printers which do not need capping. As such, Tsugita is completely non-analogous art, thereby making reliance on Tsugita improper. According to Federal Circuit precedent, correctly summarized at MPEP § 2141.01(a): "in order to rely on a reference as a basis for rejection, the reference must either be in the field of Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned."

In the current situation, Tsugita is from the field of wire dot impact printers which print by impacting a wire matrix of a recording head against a ribbon, thereby transferring ink from the ribbon onto a recording medium; no capping mechanism is needed by such printers. The present invention is from the field of ink jet printers that print by ejecting ink from the print head onto a recording medium; such printers require a capping mechanism. Thus, Tsugita is not in Applicants' field of endeavor.

Furthermore, Tsugita is not reasonably pertinent to the particular problem with which the inventors were concerned. The present inventors were concerned with cooling

a print head before capping in order to form a better ink meniscus and reduce the likelihood of ink drying in the print head nozzles and supply tubes. In contrast, Tsugita is directed to the problem of reducing noise associated with a cooling fan and the wire dot impact print head operating simultaneously. Clearly, nothing in Tsugita "logically would have commended itself to [Applicants'] attention in considering his problem" (In re Clay, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992)).

However, assuming arguendo that Tsugita could be applied against the present invention, the present invention according to Claims 1 and 4 still would not have been obvious. Tsugita is seen to disclose a wire dot impact printer that includes a cooling fan for cooling a print head. The print head temperature is monitored such that, upon commencing a printing operation, if the print head reaches a temperature T1, the cooling fan is engaged to cool the print head. Once the print head cools to a temperature T2, the cooling fan is disengaged. Nowhere does Tsugita disclose or suggest a print head capping operation, despite statements to the contrary in the Office Action. Therefore, Tsugita is not seen to disclose or to suggest at least the feature of controlling a capping sequence based on a determined print head temperature (Claim 1), or capping a print head after the print head has been cooled (Claim 4).

Midorikawa is not seen to overcome the foregoing deficiencies of Tsugita. Midorikawa is seen to disclose an ink jet cap and wiper mechanism having a construction that reduces the size of the ink jet printer in the axial (scanning) direction. Nowhere does Midorikawa disclose or suggest at least the feature of controlling a capping sequence based on a determined print head temperature (Claim 1), or capping a print head after the print head has been cooled (Claim 4).

Therefore, independent Claims 1 and 4, as well as the claims dependent therefrom are believed to be allowable over any permissible combination of Tsugita and Midorikawa.

The present invention according to amended independent Claim 7 cools a print head by causing ink droplets to be ejected from the print head at the end of a printing operation. By ejecting ink droplets, hot ink is ejected instead of being retained in the print head nozzles and ink flow passages with cooler ink taking its place, thereby cooling the print head. As a result, the time required to cool the print head is reduced since the hot ink is replaced with cooler ink.

Specifically, amended Claim 7 is a method of controlling a print operation of an ink jet printer, comprising the steps of printing an image using a print head, and cooling the print head by causing ink droplets to be

ejected from the print head after the end of the printing operation.

Neither Tsugita or Midorikawa are seen to disclose the features of Claim 7. In particular, since Tsugita is a wire dot impact printer and does not eject ink, Tsugita fails to disclose or suggest at least the feature of cooling a print head by causing ink droplets to be ejected from the print head. Midorikawa merely discloses a capping mechanism with no disclosure of cooling a print head by ejecting ink. Therefore, Claim 7 is believed to be allowable over the art of record.

The present invention according to amended independent Claim 10 controls a print operation of an ink jet printer by obtaining a parameter corresponding to a print head temperature when the printer is down in order to determine whether a print head cooling operation has been interrupted. Depending on the parameter obtained, a predetermined process is performed.

With this arrangement, if the printer is powered off before a cooling operation of the print head has completed, thus resulting in hot ink being retained in the print head nozzles, various operations such as ink purging may be performed in order to ensure better print quality when printing resumes.

Thus, amended independent Claim 10 is a method of controlling a print operation of an ink jet printer, comprising the steps of obtaining a parameter corresponding to a print head temperature when the ink jet printer is down in order to determine whether a print head cooling operation has been interrupted, and performing a predetermined process based on the parameter.

The applied art is not seen to disclose or to suggest the features of Claim 10. In this regard, Tsugita detects the print head temperature to turn the cooling fan on or off. However, Tsugita does not obtain the print head temperature when the printer is down in order to determine whether a print head cooling operation has been interrupted. Midorikawa merely discloses a capping mechanism and does not disclose obtaining the print head temperature when the printer is down in order to determine whether a print head cooling operation has been interrupted. Accordingly, Claim 10 is also believed to be allowable.

In view of the foregoing amendments and remarks, the entire application is believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

As a formal matter, Applicants note that they still have not received a copy of form PTO-948 as requested in the Request For Copy Of Form PTO-948 filed November 18, 1999.

Therefore, Applicants again respectfully request a copy of the form PTO-948 that was indicated as being included with the Official Action mailed November 3, 1999.

Applicants' undersigned attorney may be reached in our Costa Mesa, CA office by telephone at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,


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